PHILOSOPHICAL TRANSACTIONS.

April 27. 1674.

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Conſiderations of Mr. Leewenhoeck, *touching the Compreſſion of the Air; ſent to the Publiſher in his Letter of* Auguſt 15. 1673.

I Cannot forbear to give you my thoughts concerning the Compreſſion of the Air. I take a narrow glaſs-pipe, as here (in *Fig.* 1.) A B, hermetically ſealed above in A; which pipe I fill about half full of water, as E B: Into it I inſert the forcer D C, which is a wire, wound about at D with a piece of leather fitted into the glaſs-pipe, but firſt thruſt into hot Candle-greaſe, that ſo neither Water nor groſs Air

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may paſs through it. The water which is in E B, is by the Forcer D C forced up, whereby the Air, that is between A and E, is compreſſed into an hundred times leſs room than it hath before this preſſure. And foraſmuch as 'tis certain to me, that no Body can be brought into leſſer Dimenſions, than it is, except ſome other body be at the ſame time diſlodged out of it, nor any Body made bigger, but ſome other bodies muſt come into it; the Air therefore cannot be compreſs'd together, and be made an hundred times leſs, but the Air muſt permeat the Glaſs; as 'tis alſo the common opinion, that the firſt and ſubtileſt ſtuff of the Air paſſes through all cloſe Bodies. I conceive then, that the firſt and fineſt matter of Air conſiſts of ſomething like grains of Sand, taking it from the fineſt ſort to the groſſeſt; its ſecond matter, of ſomething like Bodies between the groſſeſt Sand-corns and Strawberries; its third matter, of ſomething like bodies between Strawberries and Cherries; and that all theſe parts are ſoft and fluid. I ſay then, that if the particles of the firſt ſtuff always paſs through the cloſeſt bodies (which I here ſuppoſe to be Sand-grains) it muſt follow, that by my preſſure in the Glaſs-pipe I force through the Glaſs divers particles of the ſecond ſtuff (they being all fluid) and compreſs cloſe together the moer diſtant ſecond and third ſtuff, and make them change their figure, and even in caſe there be any of the firſt ſtuff latitant in the ſecond and third ſtuff I cauſe it by the forcible preſſure to be diſlodged together, and to paſs through the Glaſs. This preſſure is greater than many imagine. The diameter of my Glaſs being of about one tenth of an Inch; if by my preſſing at C | I uſed the force but of 25 *lb.* weight, it follows, if I had a Glaſs-pipe of a whole Inch diameter, it would, to keep proportion with a Glaſs-pipe of one tenth of an Inch, require a force of 2500 Pounds.

Theſe things thus ſuppoſed, being deſirous to try, whether any particles of the ſecond ſtuff, or other parts ſomewhat bigger than the ſmalleſt ſtuff, could be preſſed or forced through the Glaſs; I prepared for that purpoſe another Glaſs-pipe (as *Fig.* 2.) and took a third one of half its length, and ſo much wider, as to ſhoot over the ſecond, as here G M: Which wider pipe I cloſed to G by means of the fire, leaving it open at at the end M with a hole as ſmall as a hair, imagining, that if by the Forcer K H, I ſhould force up towards L the water that is between I N, that then the particles driven out of the inner Glaſs, and being bigger than thoſe which by the continual Ethereal motion paſs through it, and paſſing into the exterior Glaſs, would there require more ſpace, and conſequently drive out ſome Air at the little hole in the exterior pipe at M: And to ſee the event hereof, I did put in the outermoſt part of the ſmall hole M a little water, which filled the hole only on the foremoſt part of it, thinking, that as I ſhould drive the Air out of the innermoſt Glaſs, the ſame paſſing into the exterior Glaſs, would thruſt the water out of the little hole. But what motion ſoever I make with the Forcer K H, and preſs out the Air N L, the water at the ſmall hole M keeps its ſtation : and yet, if I do but apply my warm hand to the exterior pipe M G, the water at M preſently flies out. This puzzles me ; nor can I find a ſatisfactory reaſon for this *Phænomenon.*

More Microſcopical Obſervations made by the ſame M. Leewenhoeck, *and promiſed in* Numb. 97. *of theſe Tracts; Communicated in his Letters of* Auguſt 15. 1673 *and of* April 7. 1674.

1. I Have divers times endeavoured to ſee and to know, what parts the *Blood* conſiſts of; and at length I have obſerv'd taking ſome Blood out of my own hand, that it conſiſts of ſmall round globuls driven through a Cryſtalline humidity or water: Yet, whether all Blood be ſuch, I doubt. And exhibiting my Blood to my ſelf in very ſmall parcels, the globuls, yielded very little colour.

2. I have likewiſe obſerv'd ſome of the ſweet *Milk* of Cows, and find that alſo to be made up of ſmall tranſparent globuls, carried in the ſame manner as in the Blood through a clear liquor.

3. I have alſo viewed in my Microſcope ſome of the *Hair* of my own Head, which heretofore I imagined to have ſeen to grow out of globuls, that are not driven out to the end, as I obſerved it was done in Trees and Plants, but that they united in the skin, and in the root of the hair; ſo that Hair grows

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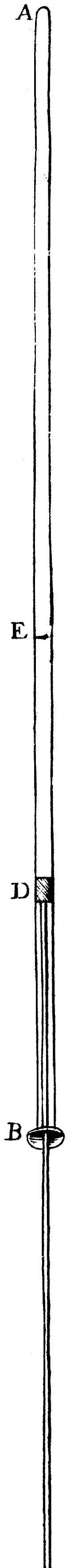

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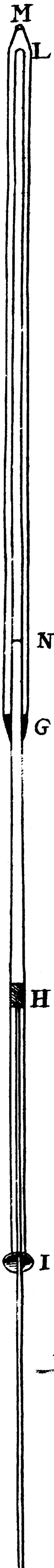

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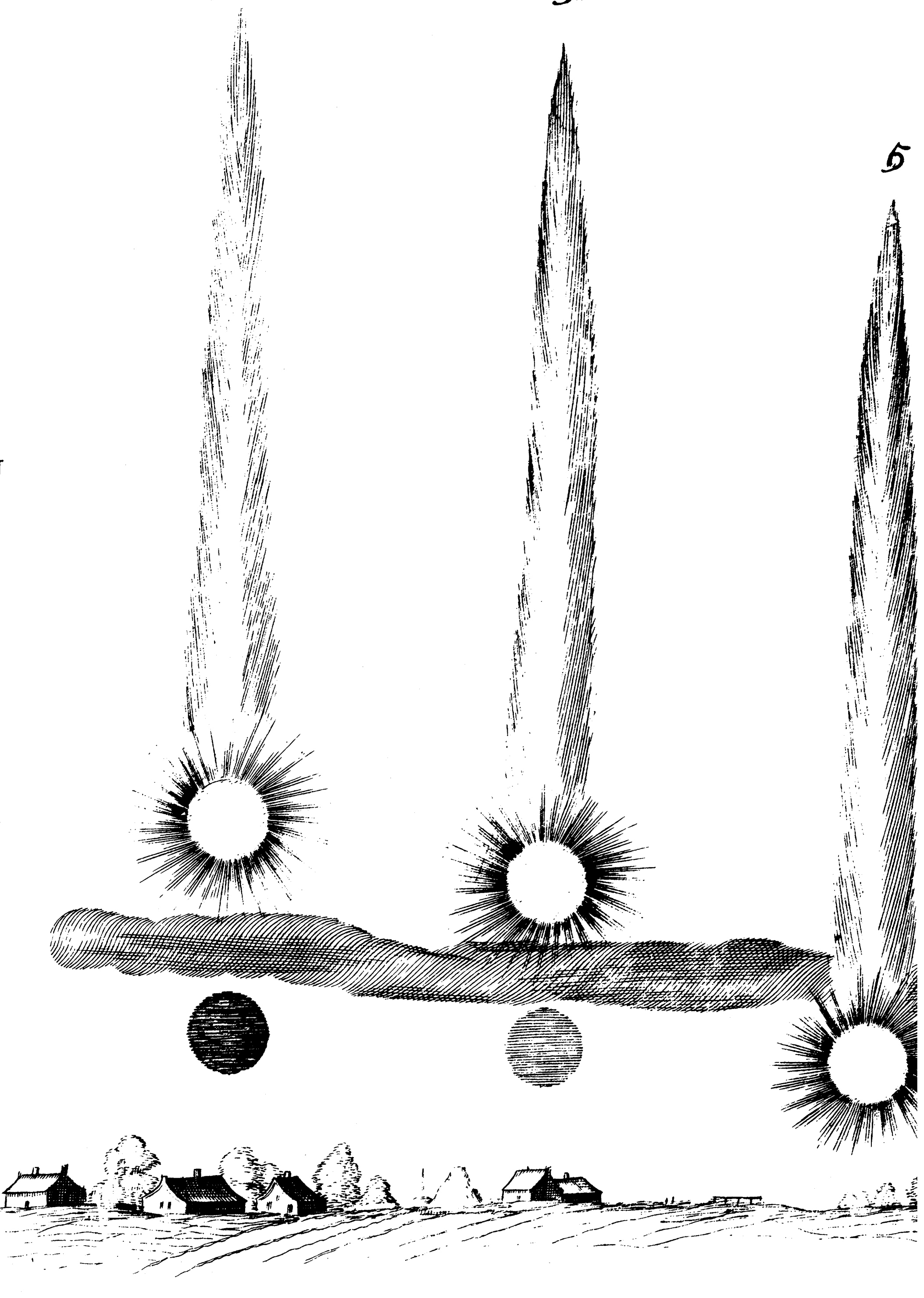

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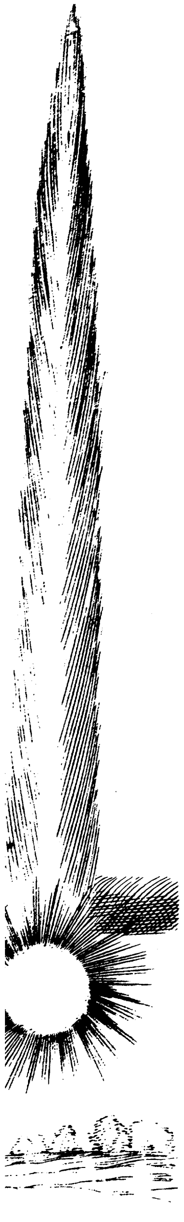

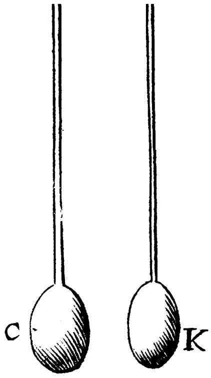
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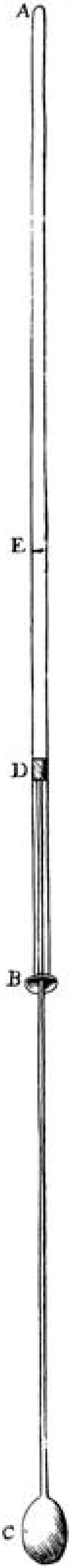

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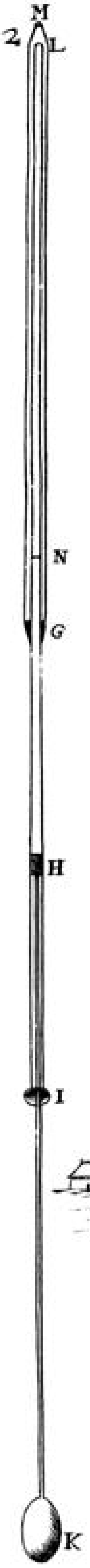

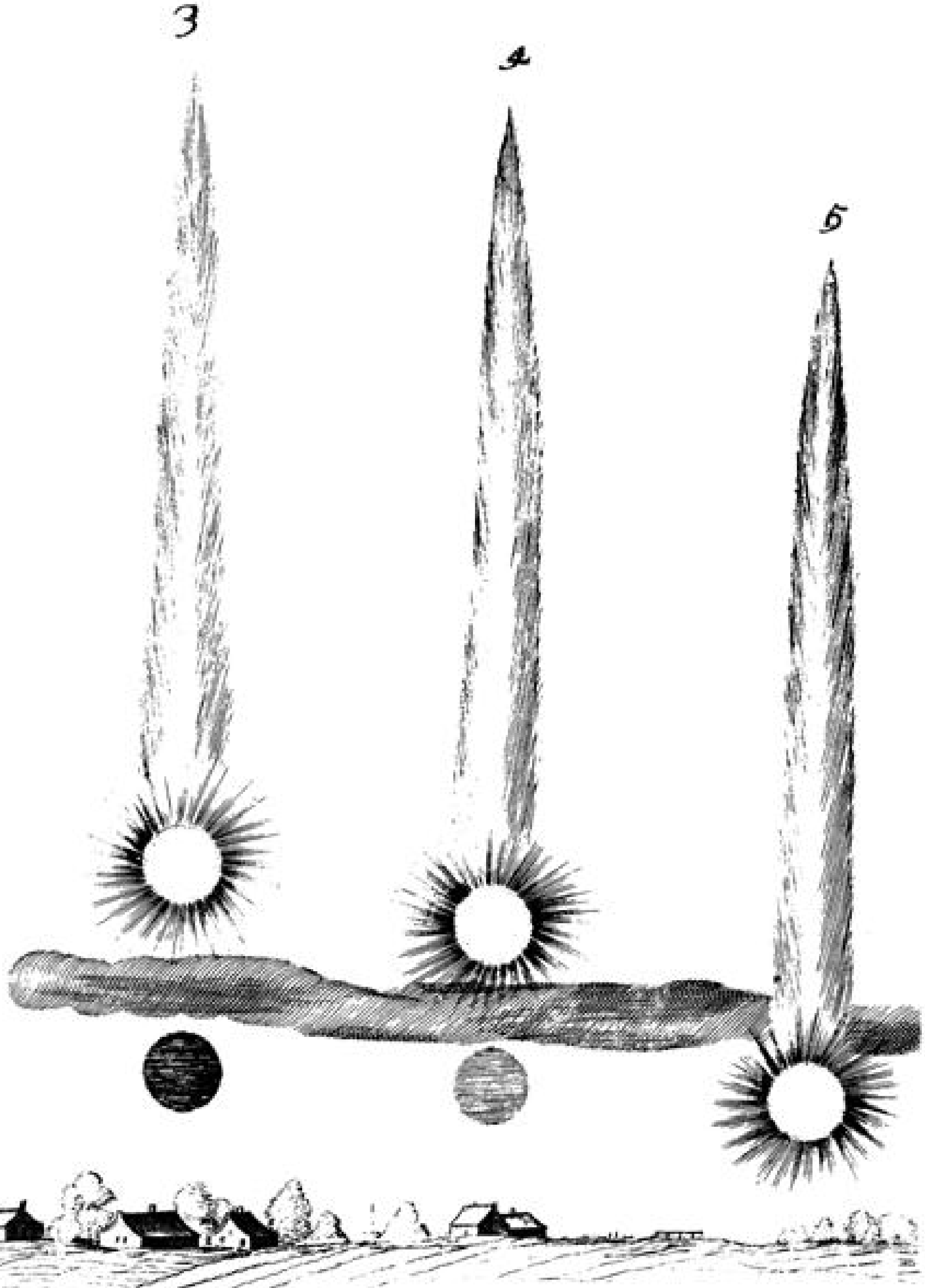

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